REMARKS

In the last Office Action, the drawings were objected to as failing to contain labels for the blank boxes in Figs. 1, 7, 11 and 13. Claims 1-17 and 19-28 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,101,164 to Kado et at. ("Kado"). The Examiner stated that Kado discloses an information recording apparatus comprising all features of the claimed invention, including a probe 4 having a microscopic aperture at the tip thereof for producing or scattering near field light, probe access means for scanning the tip of the probe across a surface of the recording medium, and heat radiating means 8 or 36 for radiating heat through the tip of the probe, wherein the surface of the recording medium is provided with a thin film that varies in physical properties in response to heating of the surface by the tip of the probe.

Claim 18 was rejected under 35 U.S.C. §103(a) as being unpatentable over Kado in view of U.S. Patent No. 6,535,474 to Yee et al. ("Yee"). Yee was cited as disclosing the use of an optical fiber probe tip 14 as recited in claim 18.

By the present response, claims 1, 7, 9, 20, 21, 24 and 27 have been amended in minor clarifying respects and new claims 29-31 have been added to provide a more comprehensive

scope of coverage. Replacement sheets for Figs. 1, 7, 11 and 13 have been submitted herewith, and comprise versions of the original drawings revised to include labels for blank boxes 4, 7, 8, 9, 10, 11, 22, 33 and 34.

Applicants respectfully submit that claims 1-31 patentably distinguish over the prior art of record.

As pointed out by applicants at pages 1-2 of the specification, a magneto-optical recording device retrieves information stored on a recording medium by detecting the light polarization state of a reflected or transmitted portion of light emanating from the recording medium. In such a device, the reflected or transmitted light must be passed to a photodetector, which results in a substantial loss of light.

Near-field light, which has recently been proposed for use in optical recording devices, has an inherently low intensity. As a result, it would be difficult to employ a conventional magneto-optical recording scheme in an optical memory which utilizes near-field light for the recording and/or reading of data.

The present invention overcomes the foregoing problem by heating a desired region of a recording medium by or in addition to the use of near-field light. In accordance with one aspect of the present invention recited by independent device claims 1, 9 and 20, the inventive

information recording apparatus comprises a probe for producing or scattering near-field light and heat radiating means for radiating heat through the tip of the probe to record information on a recording medium. The surface of the recording medium has a thin film that varies in physical properties in response to heating of the surface by the tip of the probe.

More specifically, in accordance with the present invention, the surface of the recording medium or the probe is illuminated to produce near-field light. A sharpened tip of the probe is brought into close proximity to the recording medium surface and information is recorded onto the recording medium by locally intensified energy caused by insertion of the probe tip in a region of the near-field light.

Because near-field light is produced on the surface of the recording medium by illuminating the surface of the recording medium, high density recording of information can be achieved without the transmission of light through the recording medium, i.e., even onto an opaque recording medium.

In the embodiment illustrated in Figs. 10 and 11 of the application drawings, for example, a tip of a probe 26 is inserted in a region of near-field light localized on the surface of a recording medium 3 and caused to access a desired

point on the recording medium 3. This causes the near-field light 29 to scatter at the tip of the recording probe 26, producing scattered light (propagation light) having an intensity distribution greater in a vicinity of the tip of the recording probe 26. Due to this, an intensified energy region 30 is caused to overlap with the energy given off by the localized near-field light 29 in the desired point on the recording medium 3 accessed by the tip of the recording probe 26. The intensified energy region 30 causes the phase change film of the recording medium 3 to reach a phase shift temperature at the desired point, which could not be attained by only the energy of the near-field light. Thus, high density information recording is made possible on the recording medium 3.

To reproduce the information recorded by the intensified energy region 30, laser light 28 comparatively weak in intensity is applied to the backside of the recording medium 3 such that the intensified energy region 30 in the information recording process described above has an intensity level insufficient to raise the phase change film to the phase shift temperature. The comparatively weak intensity laser light 28 produces near-field light 29 having a similarly comparatively weak intensity. The tip of the recording probe

26 is inserted in a region of the produced near-field light 29 to scatter the near-field light 29, thereby obtaining scattered light (propagation light) 31. The propagation light 31 is guided to a photodetector by a focusing optical system 27. Accordingly, data stored at the above-described point on the recording medium 3 is accessed by the tip of the recording probe and the state of the data is determined based on an intensity or phase of the propagation light 31. Thus, reading of the data stored on the recording medium 3 is easily achieved.

No corresponding structure or method is disclosed or suggested by the prior art of record.

Kado discloses a magneto-optical recording and playback device utilizing phase change technology. A conductive probe 4 is brought into close proximity to or in contact with a recording surface of a phase change recording medium 1, and is movable relative to the recording medium 1. Information is recorded by heating the recording medium 1 in the area proximate the conductive probe 4. The area of the recording medium 1 proximate to or in contact with the conductive probe 4 is heated by applying a voltage between the conductive probe 4 and the recording medium 1.

However, while Kado discloses the heating of a phase change recording medium to record information thereon, it

fails to disclose or suggest the use of near-field light or the use of a probe which produces or scatters near field light as required by independent device claims 1, 9 and 20, or an illumination light source for producing near-field light above the surface of a recording medium as required by independent device claim 7, or a method for recording information in which near-field light is produced or scattered near the surface of a recording medium as required by independent method claims 9, 11 and 28.

A finding of anticipation requires the disclosure, by a single reference, of all claimed subject matter. In the absence of any disclosure by Kado of the generation or scattering of near-field light in the vicinity of the surface of a recording medium by a probe or an illumination source, as required by each of independent claims 1, 7, 9, 11, 20 and 28, anticipation cannot be found. See, e.g., Scripps Clinic & Research Foundation v. Genentech Inc., 18 USPQ2d 1001, 1010 (Fed. Cir. 1991) ("Invalidity for anticipation requires that all of the elements and limitations of the claim are found within a single prior art reference ... There must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention"); and W.L. Gore & Associates v.

Garlock, Inc., 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984) ("Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration").

Kado fails to disclose or suggest the generation or scattering of near-field light and, accordingly, does not anticipate the invention recited by independent claims 1, 7, 9, 11, 20 and 28.

Thus, applicants respectfully submit that the anticipatory rejection of claims 1-17 and 19-28 is in error and should be withdrawn.

Yee is not citable as prior art against the claims of the captioned application. This application is a U.S. national stage application of PCT/JP99/00572, filed February 10, 1999, and claiming a priority date of February 10, 1998. Yee has a U.S. filing date of April 13, 2000 and a priority date of April 15, 1999, two months after the priority date of the captioned application.

Accordingly, Yee is not prior art relative to any of the claims of the captioned application and the rejection of claim 18 under 35 U.S.C. §103(a) is believed to be in error and should be withdrawn.

In view of the foregoing amendments and discussion, the application is now believed to be in condition for

allowance. Accordingly favorable reconsideration and allowance of the claims are most respectfully requested.

Respectfully submitted,

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MAILING CERTIFICATE

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October 28, 2003
Date